

**Notice of Allowability**

Application No.

09/902,695

Applicant(s)

LU, CHUN CHIAN

Examiner

Dac V. Ha

Art Unit

2634

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 07/12/01.
2. ☒ The allowed claim(s) is/are 1-20, renumbered as 1-20, respectively.
3. ☒ The drawings filed on 12 July 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All   b) ☐ Some\*   c) ☐ None   of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 04/28/03, 05/05/03
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date 10/23/04.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

### **EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Lawrence D. Eisen (Reg. No. 41,009) on 10/21/04.

The application has been amended as follows:

**Claim 2:**

Line 1, "the symbol amplitude approximation is" has been changed to --the approximated symbol amplitudes are--

Line 2, "the symbol amplitude" has been changed to --the approximated symbol amplitudes--

Line 3, "the signals" has been changed to --signals--

Line 3, "the symbol amplitudes" has been changed to --the approximated symbol amplitudes--

Line 4, "particular user" has been changed to --single-user--

**Claim 4:**

Line 1, "the perturbation" has been changed to --a perturbation--

**Claim 5:**

Line 11, "a set" has been changed to --the set--

**Claim 6:**

Line 1, "the symbol amplitude approximation is" has been changed to --the approximated symbol amplitudes are--

Line 2, "the symbol amplitude" has been changed to --the approximated symbol amplitudes--

Line 3, "the signals" has been changed to --signals--

Line 3, "the symbol amplitudes" has been changed to --the approximated symbol amplitudes--

Line 4, "particular user" has been changed to --single-user--

**Claim 8:**

Line 1, "the perturbation" has been changed to --a perturbation--

**Claim 10:**

Line 1, "the symbol amplitude approximation" has been changed to --the approximated symbol amplitude--

Line 2, "the symbol amplitude" has been changed to --the approximated symbol amplitude--

Line 3, "the signals" has been changed to --signals--

Line 3, "at least" has been changed to --the at least--

Line 3, "the symbol" has been changed to --the approximated symbol--

Line 4, "the particular" has been changed to --a particular--

**Claim 12:**

Line 1, "step (iv)" has been changed to --step (v)--

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Line 2, "the set" has been changed --a set--

Claim 13:

Lines 1-2, "a correlation matrix" has been changed to --the set of correlation matrices--

Claim 14:

Lines 1-2, "a correlation matrix" has been changed to --the set of correlation matrices--

Claim 15:

Line 4, "the plurality of users" has been changed to --a plurality of users--

Claim 16:

Line 1, "the symbol amplitude approximation" has been changed to --the approximated symbol amplitude--

Line 2, "the symbol amplitude" has been changed to --the approximated symbol amplitude--

Line 3, "the signals" has been changed to --signals--

Line 3, "the symbol amplitudes" has been changed to --the approximated symbol amplitude--

Line 4, "particular user" has been changed to --single-user--

Claim 19:

Line 1, "the perturbation correction" has been changed --the perturbation correction value--

Line 1, "step (iv)" has been changed to --step (iii)--

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Claim 20:

Lines 5-6, "a plurality of users" has been changed to --the plurality of users--

Line 11, "and the decorrelation matrix" has been deleted.

Lines 12-13, "the symbol amplitude" has been changed to --the approximated symbol amplitudes--

Line 14, "the signal" has been changed to --signal--

Line 14, "at least" has been changed to --the at least--

Lines 14-15, "the symbol amplitude" has been changed to --the approximated symbol amplitudes--

Line 15, "the at least one user" has been changed to --the at least one of a plurality of users--

2. The following is an examiner's statement of reasons for allowance:

The present invention relates to a multi-user detection scheme in a multiple-access system. Conventional method for detecting signal uses an auto-correlation technique in which the entire received signal is correlated to a particular user code waveform. Other methods model the received signal over the entire message, thus introduce abundance of excess processing. The present invention provides method and apparatus to significantly reduce the amount of processing when detecting the signal in multi-user system. Particularly, prior art of record, taking individually or collectively, fails to fairly teach method and apparatus, as claimed, including the claimed subject matter:

"i) defining a frame including a plurality of user signals, each user signal having at least three symbols within a window of the frame;

ii) approximating a plurality of symbol amplitudes for each user among a plurality of users in the window;"

"iv) calculating a current estimate of the approximated symbol amplitudes corresponding to at least one symbol of every user in the window using the set of correlation matrices in a perturbation correction technique; and

v) shifting the window of the frame and returning to step (iv) when an entire user signal has not been processed" in independent claims 1, 5, 9, 20 (claims 2-4, 6-8, 10-14, 18 depend therefrom) and

"i) defining a frame including a plurality of user signals, each user signal having at least three symbols within a window of the frame;

ii) approximating a symbol amplitude for each user of a plurality of users in the frame'

iii) obtaining a perturbation correction value using immediate feedback, wherein a new estimated amplitude is used as soon as it is available;

iv) calculating a current estimate of the approximated symbol amplitude corresponding to at least one symbol of every user in the frame based upon a perturbation correction calculation; and

v) shifting the window and returning to step (iv) when an entire user signal has not been processed" in independent claim 15 (claims 16-19 depend therefrom). Thus, claims 1-20 are found to be novel and unobvious over prior art of record.

***Conclusion***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Huang et al. (US 6,301,293) disclose Detectors For CDMA Systems.

Lim et al. (US 6,240,099) disclose Multi-User Code Division Multiple Access Receiver.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dac V. Ha whose telephone number is 571-273-3040. The examiner can normally be reached on 5/4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Dac V. Ha", with a horizontal line underneath the signature.

Dac V. Ha  
Examiner  
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